

The Vegetable and Small Fruit Gazette

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Horticulture Department
The Pennsylvania State University

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Tip for the Month--“May each new day brings a rebirth in your spirit of enthusiasm, caring, curiosity and good will”

Comments from the Editor

Bill Lamont, Department of Horticulture

Happy New Year!!! Old Man Winter has certainly lowered the temperatures today.. Be sure to check the many local, regional and national meetings in the Upcoming Meeting list to see what meetings are being held in your area. I look forward to receiving Tom Butzler's article for the February issue. I want to thank colleagues from other departments who contributed articles to this issue and I want to encourage others to join us in upcoming issues. If you have an event that you would like to advertise, please send it to me. As always, the Vegetable and Small Fruit Gazette Team encourages your feedback so that we can better serve your needs and address your concerns.

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Schedule for Agent Articles

Bill Lamont, Department of Horticulture

February	Tom Butzler
March	Steve Bogash
April	Scott Guiser
May	George Perry
June	Lee Young
July	Eric Oesterling
August	Jeff Mizer
September	Emelie Swackhamer
October	Cheryl Bjornson
November	John Esslinger
December	Andy Muza

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Burner Unit for Burning Used Ag Plastics Arrives

Jim Garthe, Department of Ag and Biological Engineering
Mike Orzolek and Bill Lamont, Department of Horticulture

We just received shipment today of a burner from South Korea that uses used plastic (polyethylene) as a fuel source that heats water as an energy source and can be use in a high tunnel, greenhouse, storage building, animal structure or residential house. The burner with 2.5ton water tank is 8 feet long and 4 feet wide. It will produce approximately 250,000 BTUs when the plastic is burnt in the furnace. We are in the process of constructing a 30' wide by 96' long high tunnel from Ledgewood Farms and will be heating it using the Korean Plastic Burning unit. Jim Garthe, the Ag Engineer on this project has developed a densifying unit for all used plastics (plastic mulch film, drip irrigation tape, plastic greenhouse covers, plastic pots, hay bale wraps, and silage bags) which will produce a plastic nugget "plastofuel" similar to a lump of coal. This "plastofuel" will be burned in the Korean unit and evaluated for efficiency and air emissions. In the next several weeks, we hope to place this information with photos on our Center for Plasticulture website <http://plasticulture.cas.psu.edu>.

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Herbicide Persistence

Mike Orzolek, Department of Horticulture

Herbicides are applied to the soil in hopes of obtaining season-long weed control during the season of application, but they should not remain in the soil long enough to affect subsequent crop growth. The length of time that a herbicide remains active in the soil is called "soil persistence". Soil persistence of herbicides can be as short as 1 month for herbicides like 2,4-D or glyphosate or longer than 12 months for herbicides like bromacil – Hyvar and imazapyr – Arsenal. Anything that affects the disappearance or breakdown of a herbicide affects persistence. Most factors that affect herbicide persistence fall into 3 categories; soil factors, climatic factors, and herbicidal properties.

Soil factors

Soil composition (the amount of sand, silt, and clay in soil) affects herbicide phytotoxicity and persistence (organic matter, soil pH and CEC) through adsorption, leaching, and volatilization. Generally, soils high in clay, organic matter, or both have a greater potential for herbicide carryover because there is increased adsorption to soil colloids, with a corresponding decrease in leaching and loss through volatilization. Soil pH affects herbicide persistence. So although decreased adsorption of triazine herbicides occurs in soils of higher pH, there is also less breakdown activity. Certain members of the sulfonylurea group (chlorsulfuron - Telar and chlorimuron - Classic) can also persist in higher pH soils because rates of chemical breakdown are decreased. Low soil pH affects the persistence of clomazone - Command and the imidazolinones (imazaquin - Scepter and imazethapyr – Pursuit). The CEC of soil is directly involved in herbicide adsorption. Some herbicides are more available in the presence of certain cations, whereas others may be tied up and therefore unavailable.

Soil microorganism are partially responsible for the breakdown of many herbicides. The type of microorganisms in the soil and their relative amounts determine how quickly decomposition occurs.

Climatic conditions

The climatic variables affecting herbicide degradation are moisture, temperature, and sunlight. Herbicide degradation rates generally increase with increased temperature and soil moisture because both chemical and microbial decomposition rates increase under conditions of higher soil temperature and moisture. Photo decomposition, or decomposition by light, has been reported for many herbicides. The dinitroanilines (trifluralin – Treflan and pendimethalin – Prowl) are sensitive to light degradation. They may be lost when surface-applied if they remain for an extended time on the soil surface without incorporation or rainfall.

Herbicidal properties

The chemical properties of a herbicide affect its persistence in soil including; water solubility, soil adsorption, vapor pressure, and susceptibility to chemical and microbial alteration or degradation. The water solubility of a herbicide helps to determine its leaching potential. Leaching occurs when a herbicide is dissolved in water and moves down through the soil profile. Herbicides that are low in water solubility, are strongly adsorbed to soil colloids, and exist in dry soils are less likely to leach and have a greater potential to persist in the soil. The vapor pressure of a herbicide determines its volatility, the process of changing from a liquid or a solid to a gas. Volatility increases with temperature. Volatile herbicides such as the thiocarbamates (EPTC – Eptam and butylate – Sutan+) must be incorporated immediately to avoid gaseous losses. These herbicides are less likely to persist than herbicides with low vapor pressure.

Table 1. Herbicide families with their persistence members.

S-triazines

atrazine (Aatrex, Atrazine)

hexazinone (Velpar)

prometon (Pramitol)

simazine (Princep)

Dinitroanilines

benefin (Balan)

oryzalin (Surflan)

pendimethalin (Prowl, Pendimax)

prodiamine (Barricade)

trifluralin (Treflan, Trilin)

Phenylureas

diuron (Karmex, Direx)

Uracils

bromacil (Hyvar-X)

terbacil (Sinbar)

Imidazolinones

imazapyr (Arsenal)

imazaquin (Scepter)

imazethapyr (Pursuit)

Sulfonylureas

chlorimuron (Classic)

chlorsulfuron (Telar)

nicosulfuron (Accent)

primisulfuron (Beacon)

prosulfuron (Peak)

sulfometuron (Oust)

Plant-growth regulators

clopyralid (Stinger)

Picloram (Tordon)

triclopyr (Garlon)

Others

bensulide (Prefar, Betasan)

clomazone (Command)

tebuthiuron (Spike)

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Bug vs. Bug - Compatibility of Pesticides with Natural Enemies

Cathy Thomas, Integrated Pest Management Program
Pennsylvania Department of Agriculture

Before implementing a pest control program using natural enemies (biocontrols), give these issues some thought and plan carefully.

The first issue to consider before starting a pest control program using biocontrols is to know what pesticides have been used on the crop itself and in the greenhouse where you will be using biocontrols. Conventional classes of insecticides such as carbamates, chlorinated hydrocarbons, organophosphates, and synthetic pyrethroids can persist for many months on plants and on the greenhouse structure itself. Insecticides from these classes usually have a negative impact on natural enemies and bumble bees used for pollination in greenhouse vegetables. If you plan to use biocontrols, transplants should not be treated with long residue pesticides. Check with the plant propagator if you do not start your own transplants.

The second issue is to determine what pesticides you can use along with the introduction of natural enemies. If a pest outbreak requires a spray treatment, use selective pesticides and spot spray when possible. A selective pesticide has these qualities:

- Non-toxic or slightly toxic to natural enemies (soft chemistry)
- Short persistence
- Does not inhibit development or reproduction of the natural enemies

Some compounds may be harmful to biocontrols at the moment they are applied, but may have a short persistence (ie, natural pyrethrins). After the recommended time period has elapsed, beneficial insects can be introduced again.

Always consult your biocontrol supplier before applying any pesticide. Even though a particular pesticide label may state that the compound is safe to use in an IPM program, it may not be safe to use with natural enemies. On line information on the side effects of pesticides on beneficial insects can be obtained through this web site:

<http://www.koppert.nl/e0110.shtml>

A list of materials for approved for organic production can be found at this web site:

Organic Materials Review Institute

<http://www.omri.org>

Here are a few additional points to consider when using pesticides with natural enemies.

- Designate a sprayer for soft pesticides and use only in biocontrol houses
- Pesticide vapors from a non-biocontrol area may have a negative impact in other areas where biocontrols are being used.
- Keep accurate records of pesticides and biocontrols that are used and note the effectiveness of those treatments.

Pesticide Use Compatibility with Biological Controls (Prepared by Cliff Sadof, Purdue University and Michael Raupp, University of Maryland)

Botanicals

Pyrethrins - somewhat compatible, short residue but very broad spectrum. Can be used to cleanup a pest

population, one to two weeks (check with biocontrol supplier) before biocontrols are introduced.

Azadirachtin - compatible, insect growth regulator derived from seeds of the neem tree, controls larval stages of insect pests.

Microbial insecticides (pathogen biological control agents)

Bacillus thuringiensis var. kurstaki - highly compatible, targets caterpillars. Larval stages must feed on plants parts containing the bacteria.

Bacillus thuringiensis var. israelensis - highly compatible, targets fungus gnat larvae.

Beauveria bassiana (fungus) - compatible, kills some soft bodied predators, short residue, broad spectrum.

Steinernema feltiae (Nematode) - compatible, targets fungus gnat larvae, low toxicity to humans.

Others

Horticultural Oil - compatible, active when wet, kills soft-bodied insects; pupal stage parasitoids not killed.

Insecticidal Soap - compatible, active when wet, kills soft-bodied insects, pupal stage parasitoids not killed

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2002-03 Matted-Row Strawberry Cultivar Trial Notes

Kathy Demchak, Department of Horticulture

Twenty-eight cultivars or advanced selections of June-bearing strawberries were planted in the spring of 2002 at Penn State's Horticulture Research Farm, and harvested for the first time in 2003. Twenty-four of these were relatively new, while four, 'Earliglow', 'Honeoye', 'Allstar' and 'Jewel', were included as standards for comparison. Plants were grown according to standard recommendations, except that insecticide and fungicide sprays were minimal. The peak harvest season was delayed by 7-10 days from 'normal' and was sometimes different than that expected. Cultivars and selections included, grouped according to their peak harvest season in 2003 were:

Early season (peak yield June 16-23): ByV1, Earliglow, Evangeline, MNUS 138, and Sable.

Early-mid season (peak yield June 20-30): Bish, Chambly, Honeoye, Mira, MNUS 694, and Primetime.

Mid-season (peak yield June 23 to July 2): Allstar, Brunswick, Darselect, L'Authentique Orléans and Mesabi.

Mid-late season (peak yield June 25 to July 5): Cabot, Eros, Jewel, L'Acadie, St. Pierre, and Winona.

Late season (peak yield June 30 to July 9): Idea, Ovation, St. Laurent d'Ortans and Yamaska.

L'Amour and Clancy were included, but due to small original plant size and a late start on establishment, yield data will be compared to other cultivars only in 2004.

A final grouping will be decided after a second harvest season in 2004, and may be different from that presented here. All yields presented below are marketable yields. For reference, marketable yields for the entire experiment ranged from a low of 6,726 for Yamaska to 20,793 for Honeoye. Percent marketable fruit ranged from 70.9% for L'Acadie to 84.8% for Yamaska. Mean berry weight over the entire season ranged from 8.5g for Sable to 18.3g for Cabot.

Results

Since 2003 was only the first harvest year, results are somewhat preliminary. However, growers may be interested in these results as they make decisions concerning cultivars to try this spring.

Out of the 5 early season cultivars tested, Earliglow had the next-to-lowest marketable yields (11,493 lb/a), and berry size was small (9.6 g/berry average over the season), but considering flavor, color, and firmness, it's still difficult to recommend any others over it. ByV1 was bred for plasticulture, and came out of dormancy too early, resulting in low yields. Evangeline yields and berry size were similar to that of Earliglow. Evangeline's berries were small, but attractive, with a rich color, consistent size and shape, and flawless caps. MNUS 138 produced the highest yields (19,634 lb/a), yielded for a longer time than most, and had large berries for an early cultivar (12.1 g), but they were soft and the flavor was a bit flat. Sable was second highest in yields (16,383 lb/a), but the berries were the smallest for all of the early-season cultivars (8.5 g), and were sweet but missing complexity. Sable plants hug the ground closely.

Among the early-mid season cultivars, Bish had excellent flavor, but like ByV1, was bred for plasticulture and came out of dormancy too early resulting in low yields. However, in this environment, it runnered and filled in the rows as well as matted-row cultivars. Chambly was average and Mira did not perform well. Honeoye produced the highest marketable yields for this category and the entire experiment (20,793 lb/a), and had good flavor and size, but berries became too dark later in the season. MNUS 694 produced the second highest yields (17,535 lb/a), and like MNUS 138, produced over a long season and had large berries that were a bit flat. Primetime was a surprise. Growers had been disappointed with its yields, but here it produced well (16,367 lb/a marketable fruit), and had the largest berries for the group (12.8 g/berry) with good flavor. Maybe it just needs a lot of water, or a lot of snow cover.

In the mid-season category, Mesabi was the highest producer of marketable yields (20,766 lb/a). Negatives are that it tends to develop a very dark color, is a bit soft, and is quite susceptible to sunscald. Allstar and Brunswick produced similarly (14,115 and 15,722 lb/a respectively), but berry quality and flavor was not notable for either one. Darselect yields were on the low side (12,021 lb/a), but size and flavor were the best for the category. It was also susceptible to leaf diseases and leafhoppers, though these were easily controlled. L'Authentique Orléans yields were low.

There was a narrow range of yields among the 6 mid-late season cultivars tested, ranging from a low of 12,096 for St. Pierre to a high of 16,092 lb/a for Cabot. Cabot was the most interesting. Its first fruit averaged 40 g (the size of a small peach), and were oddly-shaped. However, fruit quickly became normal in appearance, though large. Cabot produced very few runners, so might be worth trying in plasticulture. Flavor and firmness was good. Marketable yields of Eros were good (14,712), berries were large (14.0 g) but soft, and had a light color, making it difficult to judge when they were ripe. Berries started ripening at the tip, and often remained white near the cap. Jewel, the standard, was average with sour-tasting berries. L'Acadie was the highest producer of total yields for the category, but many fruit were unmarketable due to the bottoms of the fruit splitting open. St. Pierre has Chandler and Jewel for parents, and was a favorite for flavor. However, its fruit is light when ripe, being somewhat peach-colored. The fruit has a nice shape, and gorgeous light green caps that complement the fruit color perfectly, making it amazingly attractive for a light berry. Winona produced its berries on short pedicels, so fruit tended to hug

the ground. The pedicels (stems) on the berries broke off at the plant end rather than the cap end, so many stems remained attached.

Late-season cultivars extended the season beyond that normally considered late. All were low-yielding, so apparently high yields are sacrificed for season-extension. Idea, while producing the highest yields in this category (12, 346 lb/a), had berries that were light, soft, and oddly shaped, though flavor was good. Ovation had the best flavor and appearance for the group, though yields were on the low side (9,185 lb/a), especially considering the amount of foliage it produced. St. Laurent d'Orlans produced decent yields, but bottoms of fruit tended to split open. Yamaska produced low yields and was not well-adapted to this climate.

A sincere thanks to the Pennsylvania Vegetable Growers Association for funding this research. MNUS 138 and MNUS 694 were provided by Dr. Jim Luby from the University of Minnesota. Dr. Courtney Weber from Cornell University at the NY State Agricultural Experiment Station at Geneva provided L'Amour and Clancy, Dr. Harry Swartz of the Univ. of MD as part of Cooperative MD/NJ/VA/WI breeding program provided ByV1, and Dr. Jim Ballington of North Carolina State University provided Bish. Dr. Shahrokh Khanizadah of Agriculture and Agri-Food Canada and McGill Univ., Quebec provided Chambly, L'Authentique Orléans, L'Acadie, St. Pierre, St. Laurent d'Orlans, and Yamaska. All other cultivars were obtained from Nourse Farms of Whately, Massachusetts.

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Potato Musings

Bill Lamont, Department of Horticulture

Tentative Schedule for the Potato Sessions at the 2004 Mid-Atlantic Fruit and Vegetable Growers Convention, Hershey, PA

Bill Lamont, Department of Horticulture

Wednesday, January 28, 2004 AM and PM

Session E

Potatoes

Wednesday, January, 2004, AM

Topics and Speakers

Presiding: Bob Leiby, Lehigh County Cooperative Extension

9:00 AM **Update on Keystone Potato Products** - Roger Springer, PA Co-operative Potato Growers, 3107 N. Front St., Harrisburg, PA

9:30 – ***Ralstonia solanacearum* Race 3 (Biovar 2) Outbreaks in Geraniums, the Causal Agent of Brown Rot of Potatoes**- Dr. Seong-Hwan Kim, Plant Pathologist Supervisor, Plant Disease Diagnostic Lab, Pennsylvania Department of Agriculture, 2301 N Cameron St., Harrisburg, PA.

10:00-10:15 Industry Show and Tell

10:15 **Proper Design and Differences Between Box and Bulk Storages**- Mike Mager, Technical Consultant, Arctic Refrigeration Company of Batavia, Inc., 26 Cedar Street, Batavia, NY

11:00 **Potato Insect Management-An Update**- Dr.Gerry Ghidui, Extension Entomologist, Rutgers University.

11:30 **Update on Fungicides Available for Control of Potato Diseases**- Dr. Thomas Zitter, Extension Plant Pathologist, Department of Plant Pathology, 334 Plant Science, Cornell University, Ithaca, NY 14853

12:00-1:30 PM Lunch and Visit with Exhibitors

Session B Potatoes

Wednesday, January 28, 2004, PM

Topics and Speakers

Presiding: George Perry. Schuylkill County Cooperative Extension

1:30 PM **Results of 2003 Potato Seedpiece Treatment Study**- Dr. Melvin Henninger, Extension Vegetable Specialist, Department of Plant Science, Foran Hall, 59 Dudley Rd., Rutgers University, New Brunswick, NJ 08901

2:00 - **Breeding Potatoes for Disease Resistance**-.Dr. Barbara Christ, Professor, Department of Plant Pathology, 405 Buckhout Laboratory, Penn State University, University Park, PA 16802.

2:30 **Monitoring Resistance in Colorado Potato Beetle Populations**- Dr. Galen Dively, Department of Entomology, 4112A Plant Science, University of Maryland, College Park, MD. 20742-4454

3:00-3:15 Industry Show and Tell

3:15 **Michigan State University Potato Breeding Program**-Dr. David Douches, Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824-1325

4:00 **Snyder's of Berlin/Pro-Fac-The Cooperative Experience**- Dan Sharretts

4:30 Adjourn

Potato IPM School for Chip and Tablestock Producers

Bill Lamont, Department of Horticulture

Spread the word to potato growers to mark on their calendars to attend the "**Potato IPM School for Chip and Tablestock Producers**" to be held on March 8 and 9, 2004 at the Quality Inn, Erie, PA, which is located just off I-90 at exit 27. This program is a joint effort by Cornell University, Penn State University and the Ohio State University. I would like to thank Dr. Alan Erb for providing leadership in getting this program off the ground. More information will be forthcoming in future issues of the gazette.

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Upcoming Meetings

Bill Lamont, Department of Horticulture

Local

January 10-17, 2004. Pennsylvania Farm Show at the Farm Show Complex in Harrisburg, PA.

Jan. 16 – Morrison Cove Vegetable Growers' Meeting – Martinsburg, PA

Jan. 19 – New Holland Vegetable Growers' Meeting – Yoders Restaurant, New Holland, PA

Jan. 20 – Tri-County Vegetable Growers' Meeting – Shippensburg, PA

Jan. 22 – Susquehanna Valley Vegetable Growers' Meeting – Mifflinburg, PA

Feb. 3 – Lackawanna County Vegetable Growers' Meeting – Clark Summit, PA

Feb. 18 – Kutztown Auction Vegetable Growers' Meeting – Fleetwood, PA

Feb. 18 & 25 – Bucks County Vegetable Study Circle Meetings – Doylestown, PA

Feb. 19 – Mid-Atlantic Pumpkin School – Lancaster, PA (Tentative)

Feb 24 – Schuylkill County Regional Vegetable Growers' Meeting – Pottsville, PA

Feb. 24 - Family Farm Meeting – Lebanon, PA

Mar. 3 – Regional Potato Meeting – Schnecksville, PA

March 5-6, 2004. Passive Solar Greenhouse Workshop: Design, Construction and Year Round Production. Sonnewald Natural Foods, Spring Grove, PA. Contact: Steve Moore ((717)-225-2489 or sandemoore@juno.com

Mar. 16 – Erie County Vegetable Growers' Meeting – Erie, PA

Mar. 17 – Central PA Vegetable Growers' Meeting – Pleasant Gap or Lock Haven, PA

Mar. 18 – Northern Central PA Vegetable Growers' Meeting – location to be announced

Mar. 18 & 24 - Montgomery County Vegetable Study Circle Meetings – Collegeville, PA

September 24-25, 2004. Passive Solar Greenhouse Workshop: Design, Construction and Year Round Production. Sonnewald Natural Foods, Spring Grove, PA. Contact: Steve Moore ((717)-225-2489 or sandemoore@juno.com

Regional

January 13-14, New Jersey Vegetable Growers Association Annual Meeting, Borgata Hotel Casino, Atlantic City, NJ. Contact: Mel Henninger (732)-932-9711 Ext.120

January 21-23, 2004. Ohio Fruit and Vegetable Growers Congress , Toledo SeaGate Convention Centre and Radisson Hotel, Toledo, OH. Contact: www.ohiovegetables.org

January 27-29, 2004. Mid-Atlantic Fruit and Vegetable Conference, Hershey, PA. Contact: Bill Troxell (717)-694-3596 or e-mail: wt.pvga@tricity.net

February 5-7, 2004. Pennsylvania Association for Sustainable Agriculture's 13th Annual Conference, Farming for the Future, Conference Center, Penn State University, University Park, PA. Contact: Brian Snyder (814)-349-9856.

February 10-12, 2004 Empire State Fruit and Vegetable Expo in Rochester, NY. Contact Lindy Kubecka, (315)- 687-5734.

February 25, 2004. Bay Area Fruit School (Small and Tree fruits) Wye Research and Education Center, University of Maryland, Queenstown MD 21658. Contact: Michael Newell for agenda mnewell@umd.edu or 410-827-7388 (CCA credits and MD and Delaware pesticide credits offered)

March 8-9, 2004. Potato IPM School for Chip and Tablestock Producers, Quality Inn, Erie, PA. Contact: Alan Erb, Phone: (716) 432-3180

National

January 6-10, 2004: National Potato Council 55th Annual Meeting, Cancun, Mexico, Moon Palace Resort. Contact: (202) 682-0333, or www.nationalpotatocouncil.org.

International

August 28-31, 2004. 17th International Lettuce and Lettuce and Leafy Vegetable Conference, Quebec, Canada. Contact: Dr. Sylvie Jenni (450)-346-4494 ext. 213 or jennis@agr.gc.ca